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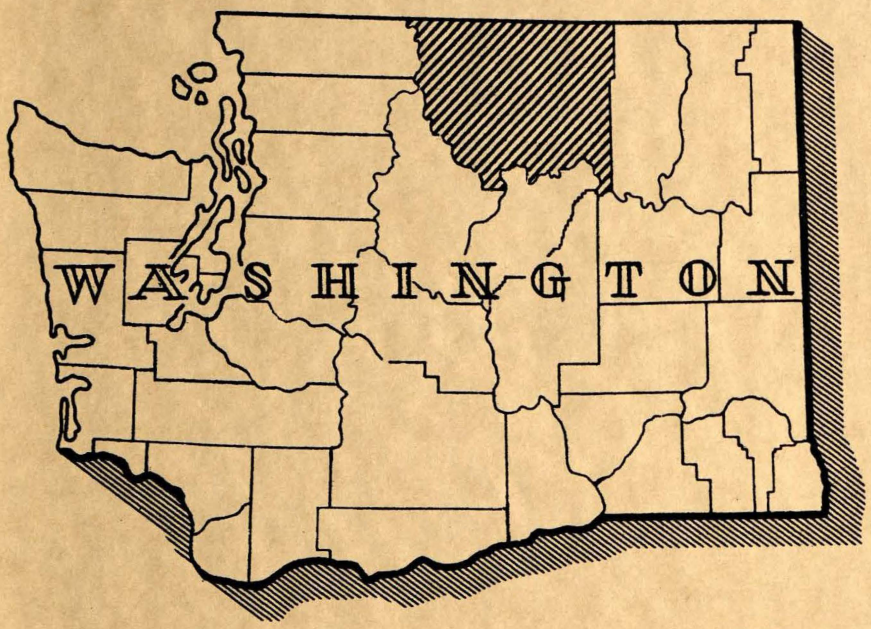
FOREST SURVEY REPORT 139

MARCH 1962

FOREST STATISTICS *for* OKANOGAN CO., WASHINGTON



PACIFIC NORTHWEST
FOREST AND RANGE EXPERIMENT STATION
U.S. DEPT. OF AGRICULTURE · FOREST SERVICE

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Forest Survey Report 139

FOREST STATISTICS FOR

OKANOGAN COUNTY, WASHINGTON

by

John M. Berger

March 1962

PACIFIC NORTHWEST
FOREST AND RANGE EXPERIMENT STATION
R. W. Cowlin, Director Portland, Oregon

FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

PREFACE

This publication summarizes the results of a 1958-59 reinventory of the forests of Okanogan County, Wash. The reinventory is a part of the Forest Survey, a nationwide project of the Forest Service authorized by the McSweeney-McNary Forest Research Act of 1928, amended June 25, 1949. The purpose of the Forest Survey is to periodically inventory the extent and condition of forest lands and the timber and other products on them, to ascertain rates of forest growth and depletion, to estimate present consumption of timber products and determine probable future trends in timber requirements, to analyze and make available survey information needed in the formulation of forest policies and programs, and to make resurveys as necessary to keep the basic information up to date.

The Forest Survey is conducted in the various forest regions of the Nation by the regional experiment stations of the Forest Service. In the States of Oregon and Washington, it is an activity of the Pacific Northwest Forest and Range Experiment Station at Portland, Oreg.

The initial inventory of forest lands in Okanogan County took place in 1935. A statistical report, "Forest Statistics for Okanogan County, Washington," and a forest type map on a 1-inch-to-the-mile scale were released in 1937.

Following the reinventory in 1958-59, the forest type map was revised and is available on scales of 1 and 2 inches to the mile. The 1-inch-to-the-mile map was prepared in 4 sections for the county; the 2-inch-to-the-mile map in 16 sections (see index map, inside back cover). These maps may be obtained at cost of blueprinting. For information write Director, Pacific Northwest Forest and Range Experiment Station, P. O. Box 4059, Portland 8, Oreg.

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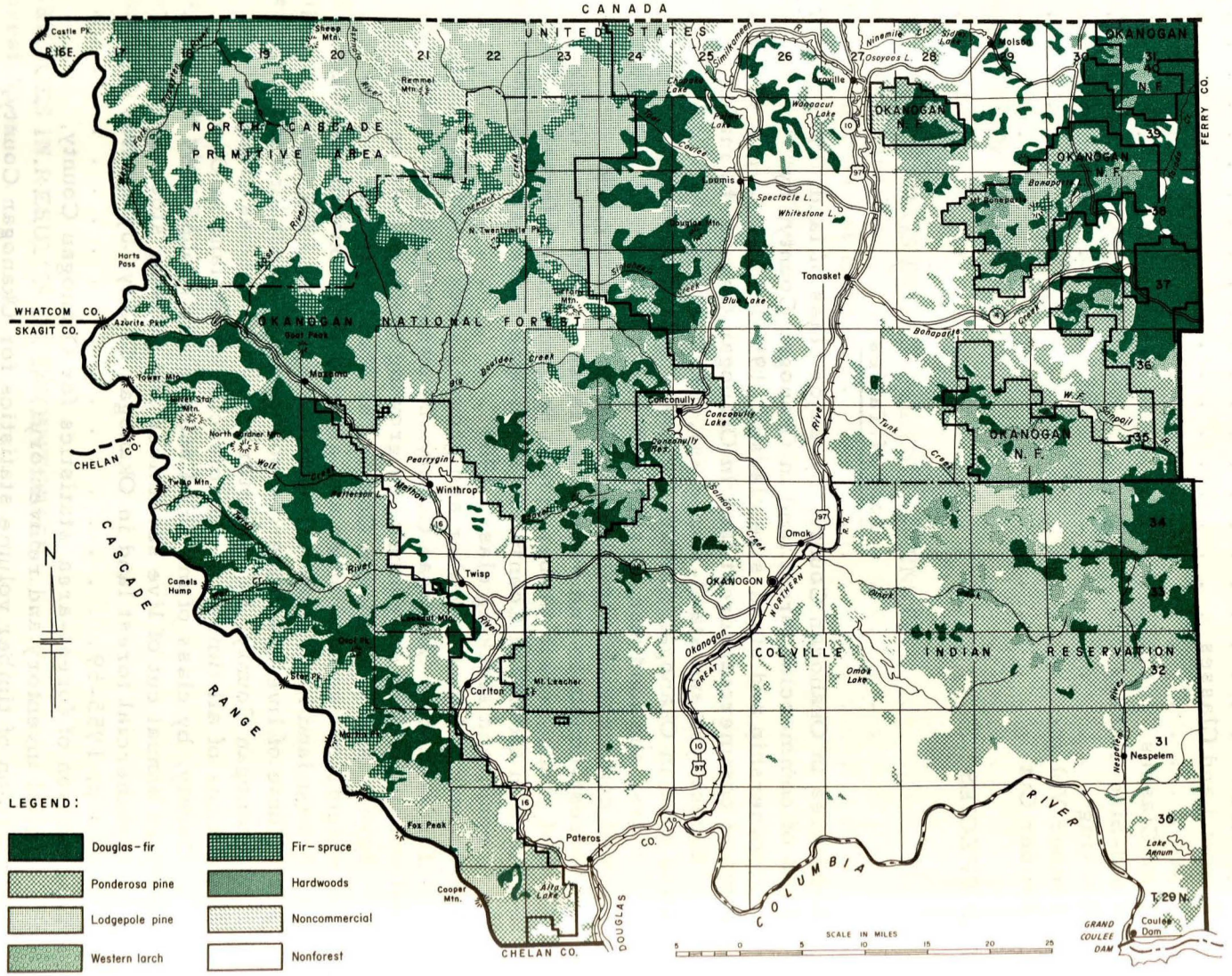
GENERALIZED FOREST TYPE MAP

OKANOGAN COUNTY, WASHINGTON

1959



DESCRIPTION OF THE COUNTY

Okanogan County is located in north-central Washington and extends from the Canadian border south approximately 65 miles to the Columbia River. From the western boundary, formed by the Cascade Range and the Methow River-Lake Chelan divide, the county extends eastward about 90 miles to Ferry County.

Most of the county is mountainous. The western part is extremely rugged with elevations ranging from approximately 700 feet along the Columbia River to 8,974 feet on the summit of North Gardner Mountain in the Cascade Range. In eastern Okanogan County the more rounded Colville Mountains rise to an elevation of 7,280 feet at the summit of Mount Bonaparte, the highest peak. Occasional benches and moderate slopes occur here but these areas are small and broken by buttes, ridges, escarpments, and coulees.

The county is drained by the Columbia River and its tributaries, the most important of these being the Okanogan and the Methow Rivers. The extreme northwestern part of the county is drained by the north-flowing Pasayten and Ashnola Rivers and the eastern portion by tributaries of the Sanpoil and Kettle Rivers.

Rainfall varies considerably throughout Okanogan County, ranging from an average of 10 inches at Omak to 60 inches in the Cascade Range.

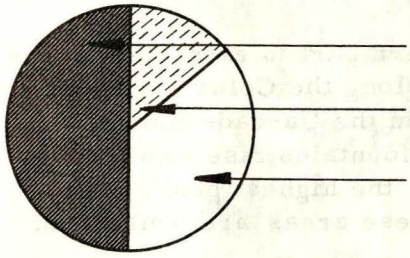
Federal Highway 97 and a branch line of the Great Northern Railroad parallel the Okanogan River from Canada south to the Columbia River. The county is also served by a small network of State, national forest, and county roads. An area of several hundred thousand acres in the northwest portion of the county is entirely roadless. Much of this area is part of the vast North Cascade Primitive Area which embraces some of the most rugged and inaccessible terrain in the continental United States.

Okanogan County has a land area of 3,375,060 acres and is one of the most sparsely inhabited counties in the State. The population in 1960, according to the Bureau of the Census, was 25,520 with a land area of 132 acres per person. Omak, the largest town, had a population of 4,068 in 1960.

SIGNIFICANT FINDINGS IN THE FOREST INVENTORY

Land Classification

Approximately one-half of the area of Okanogan County is commercial forest land.



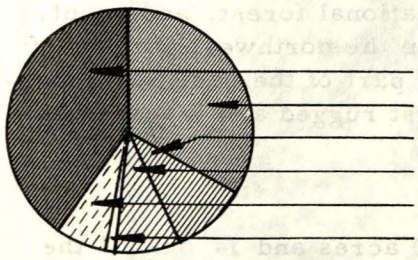
Class	Acres	Percent
Commercial forest	1,685,700	50
Noncommercial forest	456,100	14
Nonforest	1,233,300	36
Total	3,375,100	100

Of the 14 percent of Okanogan County that is noncommercial forest land, 8 percent is unproductive and 6 percent is productive-reserved land, mostly within the North Cascade Primitive Area.

Commercial Forest Land Area

Major Types

The forests of Okanogan County are almost exclusively softwoods, with ponderosa pine and Douglas-fir types predominating. Small stringers of hardwood types are occasionally found in the river valleys.

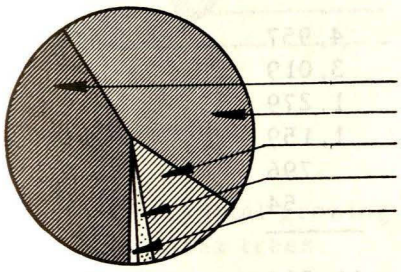


Type	Acres	Percent
Ponderosa pine	668,700	40
Douglas-fir	570,200	34
Lodgepole pine	150,600	9
Fir—spruce	115,600	8
Western larch	130,600	7
Others	50,000	2
Total	1,685,700	100

The higher elevations are dominated by the fir—spruce and lodgepole pine types, the latter occurring as a result of fire.

Stand-Size Classes

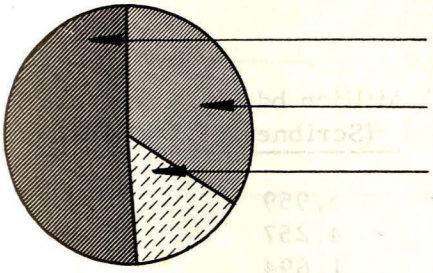
There are 1,411,300 acres of sawtimber stands in Okanogan County. Of this area, 681,900 acres are large sawtimber stands (21.0 inches d.b.h. and larger) and 729,400 acres are small sawtimber stands (11.0-20.9 inches d.b.h.).



Stand Size	Acres	Percent
Large sawtimber	681,900	41
Small sawtimber	729,400	43
Poletimber	215,300	13
Seedlings and saplings	37,800	2
Nonstocked	21,300	1
Total	1,685,700	100

Stocking of Young-Growth Stands

Most of the young-growth stands of Okanogan County are satisfactorily stocked (40-100 percent); 15 percent are poorly stocked. (Young-growth stands are those in which the majority of the cubic-foot volume is in trees less than 21.0 inches d.b.h.)



Stocking Class	Acres	Percent
Well	859,700	51
Medium	573,100	34
Poor	252,900	15
Total	1,685,700	100

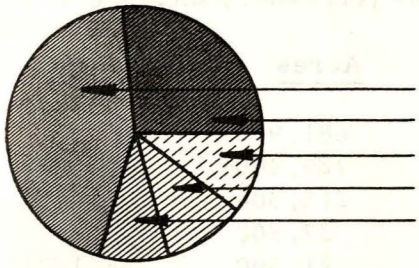
Commercial Forest Land Timber Volumes

The net volume of live, sound sawtimber trees (11.0 inches d.b.h. and larger) on commercial forest land in Okanogan County is estimated to be 11,264 million board feet, Scribner rule. Nearly all of this volume is in sawtimber stands. Only 1 percent occurs as sawtimber-size trees in poletimber and seedling and sapling stands and nonstocked areas.

Volume of Sawtimber by Species

Softwood species constitute more than 99 percent of the live sawtimber volume in Okanogan County; 71 percent of the volume is in ponderosa pine and

Douglas-fir; western larch and Engelmann spruce account for 21 percent; and the remaining 8 percent is distributed among lodgepole pine, mountain hemlock, western hemlock, western redcedar, Pacific silver fir, subalpine larch, grand fir, and western white pine.

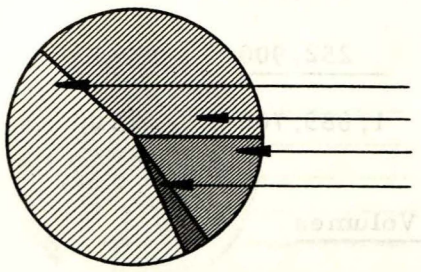


Species	Million bd. ft. (Scribner)	Percent
Douglas-fir	4,957	44
Ponderosa pine	3,019	27
Western larch	1,279	11
Engelmann spruce	1,159	10
Other softwoods	796	8
Hardwoods	54	(1/)
Total	11,264	100

1/ Less than 0.5 percent.

Volume of Sawtimber by Diameter Classes

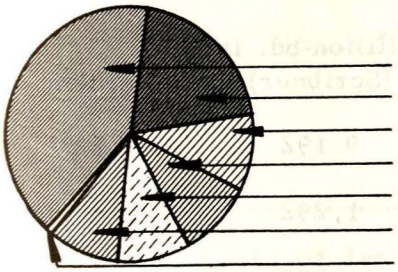
In Okanogan County, 82 percent of the sawtimber volume occurs in trees smaller than 31.0 inches d.b.h., with 44 percent in trees 11.0-20.9 inches d.b.h. and 38 percent in trees 21.0-30.9 inches d.b.h. Forty-five percent of the Douglas-fir volume and 43 percent of the ponderosa pine volume is in trees less than 21.0 inches d.b.h. Only 3 percent of the sawtimber volume is in trees 41.0 inches d.b.h. and larger.



Diameter class	Million bd. ft. (Scribner)	Percent
11.0 - 20.9	4,959	44
21.0 - 30.9	4,257	38
31.0 - 40.9	1,694	15
41.0+	354	3
Total	11,264	100

Volume of Growing Stock by Species

Growing stock volume includes all live, sound trees 5.0 inches d.b.h. and larger to a minimum 4-inch top outside bark. Douglas-fir and ponderosa pine comprise 61 percent of the growing stock in Okanogan County.



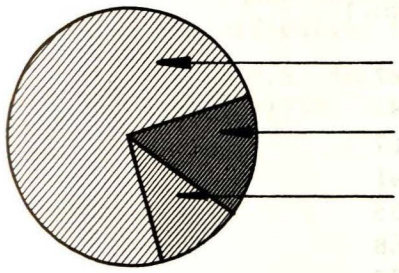
Species	Million cu. ft.	Percent
Douglas-fir	1,282	41
Ponderosa pine	611	20
Engelmann spruce	354	11
Lodgepole pine	306	10
Western larch	264	9
Other softwoods	256	8
Hardwoods	23	1
Total	3,096	100

Of the total growing stock, 72 percent is in sawtimber trees and 28 percent is in poletimber trees.

Forest Ownership

Commercial Forest Land

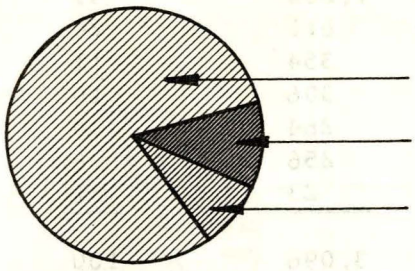
Of the commercial forest area in Okanogan County, 74 percent is federally owned or administered: 54 percent being in the Okanogan National Forest, 17 percent administered by the Bureau of Indian Affairs, and 3 percent owned by the Bureau of Land Management.



Ownership class	Acres	Percent
Federal	1,241,500	74
Private	250,400	15
State	193,800	11
Total	1,685,700	100

Sawtimber Volume

Of the total sawtimber volume, 82 percent is federally owned or administered, with over half the remainder in State ownership.



Ownership	Million bd. ft. (Scribner)	Percent
Federal	9,192	82
State	1,292	11
Private	780	7
Total	11,264	100

Log Production

In 1959, total log production in Okanogan County was 136 million board feet, Scribner rule. For the 10-year period 1950-59, the log output has averaged 112 million board feet annually, ranging from 93 million in 1952 to 136 million in 1959.

Forty-five percent of the log production in Okanogan County came from national forest lands during the 1950-59 period. The proportion of total log production coming from national forest lands has been steadily rising, from 30,700 thousand board feet in 1950 to 73,329 thousand board feet in 1959, an increase of 119 percent over the 10-year period.

	Annual production[1/] (M b.m.)
1950	102,887
1951	102,982
1952	92,817
1953	116,041
1954	123,335
1955	119,968
1956	117,827
1957	104,908
1958	103,331
1959	136,166

[1/] Does not include volume removed for poles, piling, or products from woodcutting operations.

Table 1.--Land area in Okanogan County, by major class of land, 1959

(Acres)

Class of land	Area
Forest:	
Commercial	1,685,700
Noncommercial:	
Productive-reserved	192,300
Unproductive	263,800
Total forest land	2,141,800
Nonforest land	1/ 1,233,300
All classes	2/ 3,375,100

1/ Includes 10,000 acres of water according to survey standards of area classification but defined by Bureau of the Census as land.

2/ From U.S. Bureau of the Census, land and water area of the United States, 1950.

Table 2.--Area of commercial forest land in Okanogan County, by ownership and stand-size classes, 1959

(Acres)

Ownership class	Total	Sawtimber stands	Poletimber stands	Seedling and sapling stands	Non-stocked areas
Private	250,400	194,800	47,100	5,700	2,800
State	193,800	155,900	31,300	5,700	900
County	--	--	--	--	--
Municipal	(1/)	(1/)	--	--	--
Federal:					
Indian	285,900	261,200	17,700	6,100	900
Other Federal	200	200	(1/)	--	(1/)
Bureau of Land Mgt.	43,000	37,400	4,300	300	1,000
National forest	912,400	761,800	114,900	20,000	15,700
Total Federal	1,241,500	1,060,600	136,900	26,400	17,600
All ownerships	1,685,700	1,411,300	215,300	37,800	21,300

1/ Less than 50.

Table 3.--Area of commercial forest land in Okanogan County, by major forest type and stand-size class, 1959

(Acres)

Forest type	Total	Sawtimber stands		Poletimber stands	Seedling and sapling stands	Nonstocked areas
		Large[1/]	Small[2/]			
Ponderosa pine	668,700	388,600	227,600	43,300	9,200	--
Western white pine	7,300	--	6,100	1,200	--	--
Lodgepole pine	150,600	600	35,400	97,500	17,100	--
Douglas-fir	570,200	213,200	310,000	43,200	3,800	--
Western larch	115,600	49,800	56,200	8,000	1,600	--
Fir—spruce	130,600	29,100	88,500	11,600	1,400	--
Western redcedar	600	--	600	--	--	--
Hardwood	20,800	600	5,000	10,500	4,700	--
Nonstocked	21,300	--	--	--	--	21,300
Total	1,685,700	681,900	729,400	215,300	37,800	21,300

[1/] 21.0 inches d.b.h. and larger.

[2/] 11.0-20.9 inches d.b.h.

Table 4.--Land area in Okanogan County, by cover

	Cover type or land use	Total unreserved and reserved
		PRODUCTIVE
		Total
1	Ponderosa pine, large sawtimber	388,600
2	Ponderosa pine, small sawtimber	227,600
3	Ponderosa pine, poletimber	43,400
4	Ponderosa pine, seedlings and saplings	9,200
5	Western white pine, small sawtimber	6,100
6	Western white pine, poletimber	1,200
7	Lodgepole pine, large sawtimber	600
8	Lodgepole pine, small sawtimber	46,300
9	Lodgepole pine, poletimber	125,900
10	Lodgepole pine, seedlings and saplings	49,200
11	Douglas-fir, small old-growth and large young-growth sawtimber (red fir)	218,100
12	Douglas-fir, small sawtimber	319,900
13	Douglas-fir, poletimber	43,800
14	Douglas-fir, seedlings and saplings	4,100
15	Western larch, large sawtimber	49,800
16	Western larch, small sawtimber	56,200
17	Western larch, poletimber	8,000
18	Western larch, seedlings and saplings	1,600
19	True fir—mountain hemlock, large sawtimber	5,100
20	True fir—mountain hemlock, small sawtimber	30,300
21	True fir—mountain hemlock, poletimber	7,800
22	True fir—mountain hemlock, seedlings and saplings	2,600
23	Engelmann spruce, large sawtimber	38,000
24	Engelmann spruce, small sawtimber	138,500
25	Engelmann spruce, poletimber	11,000
26	Engelmann spruce, seedlings and saplings	1,700
27	Western redcedar, small sawtimber	600
28	Hardwoods, large sawtimber	600
29	Hardwoods, small sawtimber	5,000
30	Hardwoods, poletimber	10,500
31	Hardwoods, seedlings and saplings	4,700
32	Nonstocked area	22,000
33	Total	1,878,000
		NONCOMMERCIAL
34	Subalpine	146,500
35	Noncommercial, rocky	117,300
36	Total	263,800
		NONFOREST
37	Vegetative land (cultivated, grass, or brush)	1,137,800
38	Nonvegetative land (including barrens and cities)	85,500
39	Unmeandered water	10,000
40	Total	1,233,300
		ALL
	Forest land:	
41	Commercial	1,685,700
42	Noncommercial (productive-reserved and unproductive)	456,100
43	Total forest land	2,141,800
44	Nonforest land	1,233,300
45	Total all land	3,375,100

1/ Less than 50.

type, ownership class, and land-use class, 1959

(Acres)

Unreserved									Reserved			
					Federally owned or administered							
Total	Private	State	County	Municipal	Indian	Other Federal	Bureau of Land Mgt.	National forest	Total	State	Federal (national forest)	
FOREST LAND												
Commercial									Noncommercial (productive-reserved)			
388,600	49,900	52,400	--	--	147,600	100	12,800	125,800	(1/)	(1/)	--	1
227,600	82,400	27,700	--	(1/)	41,000	100	8,100	68,300	(1/)	(1/)	--	2
43,300	23,200	5,300	--	--	5,300	--	1,000	8,500	100	100	--	3
9,200	3,000	1,600	--	--	700	--	300	3,600	--	--	--	4
6,100	--	--	--	--	--	--	--	6,100	--	--	--	5
1,200	--	--	--	--	--	--	--	1,200	--	--	--	6
600	--	--	--	--	--	--	--	600	--	--	--	7
35,400	(1/)	1,900	--	--	200	--	(1/)	33,300	10,900	--	10,900	8
97,500	800	21,400	--	--	4,200	--	300	70,800	28,400	--	28,400	9
17,100	600	3,700	--	--	3,100	--	--	9,700	32,100	--	32,100	10
213,200	7,100	27,000	--	--	22,600	--	3,500	153,000	4,900	--	4,900	11
310,000	46,500	24,900	--	--	23,400	--	10,800	204,400	9,900	--	9,900	12
43,200	16,200	2,600	--	--	1,300	--	2,600	20,500	600	--	600	13
3,800	500	100	--	--	200	--	(1/)	3,000	300	--	300	14
49,800	1,200	3,200	--	--	9,700	--	600	35,100	--	--	--	15
56,200	4,100	5,300	--	--	14,100	--	1,300	31,400	--	--	--	16
8,000	700	100	--	--	4,000	(1/)	200	3,000	--	--	--	17
1,600	100	--	--	--	1,500	--	--	--	--	--	--	18
4,900	--	--	--	--	(1/)	--	--	4,900	200	--	200	19
29,400	--	--	--	--	400	--	--	29,000	900	--	900	20
6,900	--	200	--	--	700	--	--	6,000	900	--	900	21
700	--	--	--	--	100	--	--	600	1,900	--	1,900	22
24,200	--	100	--	--	500	--	--	23,600	13,800	--	13,800	23
59,100	500	13,200	--	--	600	--	100	44,700	79,400	--	79,400	24
4,700	200	800	--	--	(1/)	--	100	3,600	6,300	--	6,300	25
700	--	100	--	--	(1/)	--	--	600	1,000	--	1,000	26
600	--	--	--	--	--	--	--	600	--	--	--	27
600	(1/)	--	--	--	--	--	--	600	--	--	--	28
5,000	3,000	200	--	--	1,100	--	100	600	--	--	--	29
10,500	6,000	900	--	--	2,200	--	200	1,200	--	--	--	30
4,700	1,600	200	--	--	500	--	--	2,400	(1/)	--	(1/)	31
21,300	2,800	900	--	--	900	(1/)	1,000	15,700	700	--	700	32
1,685,700	250,400	193,800	--	(1/)	285,900	200	43,000	912,400	192,300	100	192,200	33
UNPRODUCTIVE FOREST LAND												
68,200	100	900	--	--	--	--	100	67,100	78,300	--	78,300	34
75,000	4,400	4,600	--	--	5,800	--	7,000	53,200	42,300	(1/)	42,300	35
143,200	4,500	5,500	--	--	5,800	--	7,100	120,300	120,600	--	120,600	36
LAND												
1,119,800	712,100	77,500	(1/)	1,000	206,700	300	55,700	66,500	18,000	100	17,900	37
46,100	4,700	3,300	--	--	7,800	(1/)	1,300	29,000	39,400	(1/)	39,400	38
9,600	3,600	300	--	--	600	1,300	100	3,700	400	(1/)	400	39
1,175,500	720,400	81,100	--	1,000	215,100	1,600	57,100	99,200	57,800	100	57,700	40
LAND												
1,685,700	250,400	193,800	--	(1/)	285,900	200	43,000	912,400	--	--	--	41
143,200	4,500	5,500	--	--	5,800	--	7,100	120,300	312,900	100	312,800	42
1,828,900	254,900	199,300	--	--	291,700	200	50,100	1,032,700	312,900	100	312,800	43
1,175,500	720,400	81,100	--	1,000	215,100	1,600	57,100	99,200	57,800	100	57,700	44
3,004,400	975,300	280,400	(1/)	1,000	506,800	1,800	107,200	1,131,900	370,700	200	370,500	45

Table 5.--Area of commercial forest land in Okanogan County, by forest-condition and ownership classes, 1959

(Acres)

Forest-condition class	Total	Private	State	County	Municipal	Federally owned or administered			
						Indian	Other Federal	Bureau of Land Mgt.	National forest
Softwoods:									
Large sawtimber:									
Uncut	475,700	30,000	64,200	--	--	83,700	--	11,800	286,000
Residual	205,600	28,300	18,500	--	--	96,800	100	5,100	56,800
Total	681,300	58,300	82,700	--	--	180,500	100	16,900	342,800
Small sawtimber:									
Uncut	472,600	33,400	43,000	--	(1/)	37,600	100	13,300	345,200
Residual	251,800	100,100	30,000	--	--	42,000	(1/)	7,100	72,600
Total	724,400	133,500	73,000	--	(1/)	79,600	100	20,400	417,800
Poletimber	204,800	41,100	30,400	--	--	15,500	(1/)	4,100	113,700
Seedlings and saplings	33,100	4,100	5,500	--	--	5,600	--	300	17,600
Hardwoods	20,800	10,600	1,300	--	--	3,800	--	300	4,800
Nonstocked	21,300	2,800	900	--	--	900	(1/)	1,000	15,700
Total	1,685,700	250,400	193,800	--	(1/)	285,900	200	43,000	912,400

1/ Less than 50.

Table 6.--Area of young-growth timber stands on commercial forest land in Okanogan County, by stand-size class, species group, and stocking class, 1959[1/]

(Acres)

Stand-size class and species group	Total	Well stocked	Medium stocked	Poorly stocked
Sawtimber:				
Softwoods	724,400	361,600	264,900	97,900
Hardwoods	5,000	3,400	1,500	100
Total	729,400	365,000	266,400	98,000
Poletimber:				
Softwoods	204,800	111,600	53,900	39,300
Hardwoods	10,500	7,000	2,300	1,200
Total	215,300	118,600	56,200	40,500
Seedlings and saplings:				
Softwoods	33,100	19,900	6,200	7,000
Hardwoods	4,700	1,200	1,400	2,100
Total	37,800	21,100	7,600	9,100
All classes:				
Softwoods	962,300	493,100	325,000	144,200
Hardwoods	20,200	11,600	5,200	3,400
Total	982,500	504,700	330,200	147,600

[1/] Young-growth timber stands are those in which the majority of the cubic-foot volume is in trees less than 21.0 inches d.b.h.

Table 7.--Net volume of live sawtimber and growing stock on commercial forest land in Okanogan County, by ownership class, 1959

Ownership class	Live sawtimber volume		Growing stock volume
	Scribner rule	International 1/4-inch rule	
	Million bd. ft.	Million bd. ft.	Million cu. ft.
Private	780	868	215
State	1,292	1,429	351
Federally owned or administered:			
Indian	1,665	1,845	446
National forest	7,356	8,149	2,038
Other Federal[1/]	171	190	46
Total Federal	9,192	10,184	2,530
All ownerships	11,264	12,481	3,096

[1/] Includes Bureau of Land Management.

Table 8.--Net volume of live sawtimber and growing stock on commercial forest land in Okanogan County, by stand-size class, 1959

Stand-size class	Live sawtimber volume		Growing stock volume
	Scribner rule	International 1/4-inch rule	
	Million bd. ft.	Million bd. ft.	Million cu. ft.
Sawtimber stands	11,178	12,386	2,893
Poletimber stands	82	90	201
Seedling and sapling stands	4	5	2
Nonstocked areas	(1/)	(1/)	(1/)
Total	11,264	12,481	3,096

1/ Less than 0.5 million.

Table 9.--Net volume of live sawtimber and growing stock on commercial forest land in Okanogan County, by species, 1959

Species	Live sawtimber volume		Growing stock volume
	Scribner rule	International 1/4-inch rule	
	Million bd. ft.	Million bd. ft.	Million cu. ft.
Softwoods:			
Douglas-fir	4,957	5,513	1,282
Ponderosa pine	3,019	3,314	611
Western white pine	5	6	2
Lodgepole pine	189	221	306
Whitebark pine	30	32	15
Grand fir	3	3	4
Pacific silver fir	12	13	5
Subalpine fir	517	558	217
Engelmann spruce	1,159	1,299	354
Mountain hemlock	4	4	1
Western hemlock	17	19	5
Western redcedar	9	10	3
Western larch	1,279	1,416	264
Subalpine larch	10	12	4
Total	11,210	12,420	3,073
Hardwoods:			
Red alder	--	--	1
Quaking aspen	14	15	9
Western paper birch	1	1	2
Black cottonwood	39	45	11
Total	54	61	23
All species	11,264	12,481	3,096

Table 10.--Net volume of live sawtimber on commercial forest land in Okanogan County, by diameter class and species group, 1959

(In million board feet)

Diameter class (inches d.b.h.) and log rule	Total	Ponderosa pine	Douglas-fir	Lodgepole pine	Western larch	Engelmann spruce	Other soft-woods	Hard-woods
11.0-20.9:								
Scribner rule	4,959	899	2,237	186	506	638	472	21
International 1/4-inch rule	5,716	1,042	2,596	218	586	739	510	25
21.0-30.9:								
Scribner rule	4,257	1,311	1,892	3	524	391	119	17
International 1/4-inch rule	4,599	1,416	2,043	3	567	423	128	19
31.0-40.9:								
Scribner rule	1,694	689	685	--	202	99	10	9
International 1/4-inch rule	1,797	731	725	--	214	105	12	10
41.0 and larger:								
Scribner rule	354	120	143	--	47	31	6	7
International 1/4-inch rule	369	125	149	--	49	32	6	8
All diameter classes:								
Scribner rule	11,264	3,019	4,957	189	1,279	1,159	607	54
International 1/4-inch rule	12,481	3,314	5,513	221	1,416	1,299	656	62

Table 11.--Net volume of all timber on commercial forest land in Okanogan County, by class of material and species group, 1959

(In million cubic feet)

Class of material	Total	Softwoods	Hardwoods
Growing stock:			
Sawtimber trees:			
Saw-log portion	2,070	2,060	10
Upper-stem portion	156	155	1
Total	2,226	2,215	11
Poletimber trees	870	858	12
Total growing stock	3,096	3,073	23
Other material:			
Sound cull trees	194	183	11
Rotten cull trees	7	2	5
Salvable dead trees	118	118	--
Total other material	319	303	16
All timber	3,415	3,376	39

Table 12.--Average annual cut of live sawtimber and growing stock on commercial forest land in Okanogan County, by species group, 1955-59

Species group[1]	Live sawtimber						Growing stock		
	Scribner rule			International 1/4-inch rule					
	Annual cut[2]	Timber products	Logging residue	Annual cut[2]	Timber products	Logging residue	Annual cut[2]	Timber products	Logging residue
	Thousand board feet						Thousand cubic feet		
Softwoods	118,769	116,440	2,794	131,600	129,020	3,096	32,239	29,906	2,004

[1] Hardwood cut insignificant.

[2] Annual cut is the reduction in inventory volume resulting from the production of the given output of timber products.

FOREST SURVEY PROCEDURE

Procedures used in the reinventory of Okanogan County were materially different from those used in the initial inventory. This change in procedures accounts for some significant differences in the forest-area and timber-volume statistics obtained.

Initial Inventory

The initial inventory of the county's forests was conducted in 1935 and 1936 by what is known as the "compilation method." In this method, existing information on forest types, timber volumes, areas logged, and other inventory data were collected from private timber owners and various public agencies. These data were checked in the field for reliability and were adjusted to Forest Survey specifications and standards. Forest-type and timber-volume data for areas not covered by reliable existing information were obtained through field reconnaissance.

All land in the county was classified as either forest or nonforest. Forest land was further classified as commercial or noncommercial; the commercial was still further classified by forest type, stand-size or condition class, and--in the case of young-growth stands--by stocking and age classes. All such types and classes were mapped in place on a 1-inch-to-the-mile base map of each forested township. These township type maps were then superimposed over current ownership-status plats and dot-counted to obtain forest-type area statistics by ownership class. Type delineations on the township maps were traced to a base map of the county to form a county forest type map. The commercial forest land was also classified as to site quality, or forest productive capacity.

In-place, timber-volume estimates were based on existing cruises collected and adjusted to the Forest Survey standard, on field samples, and on ocular appraisals. Cruises made by commercial cruisers were obtained for most of the privately owned timber, and Forest Service cruises were available for a large part of the national forest lands. Separate volume estimates were computed for each of the commercial tree species and for each ownership class. Methods used in this initial inventory did not permit a statistical computation of accuracy of the estimate.

Reinventory

The reinventory of Okanogan County was a cooperative project involving national forest, State of Washington, and Forest Survey personnel. The Okanogan Working Circle inventory was completed in 1959 by the national forest inventory crews. The Colville Indian Reservation and areas outside the national forests were completed in 1958 by Forest Survey and State of Washington personnel.

The forest type map of Okanogan County was completely revised in 1959. This was done by interpreting, classifying, and field mapping the entire county

on aerial photos. Difficult type classifications were checked more closely on the ground. The delineations on the aerial photos were then transferred to a 2-inch county base map through use of a reflecting projector. The use of aerial photos resulted in type delineations that were more accurate and detailed than those obtained by the ground reconnaissance method employed in the initial inventory.

Volume estimates for live sawtimber, growing stock, and salvable dead material were derived by sampling stands with a systematic grid of field sample plots. These sample plots consisted of clusters of three 1/5-acre circular plots at 6-chain intervals.

For those areas outside the national forest, type areas were determined by a dot count on the forest type maps. The average per-acre volumes for sawtimber, poletimber, and seedling and sapling stands were obtained by sampling stands with a systematic grid of field plots evenly distributed over the county. Volume estimates were calculated by applying average per-acre volumes to the appropriate forest type areas.

Land classification for the Okanogan Working Circle was based on a systematic grid of plots. Each subplot was first classified as commercial forest, noncommercial forest, or nonforest. The ratio of subplots in each class to the total number of subplots was applied to the total land area to determine the acreage of each classification. Subplots falling on commercial forest land were also classified by forest type and stand-size class as indicated by the plot tally. The percentage of subplots falling in each type was applied to the total area of commercial forest land in the working circle to determine the acreage of land in that type.

Volume for the working circle was determined in the following manner: An average volume per acre was determined by species for all subplots falling on commercial forest land. These volumes, expanded by the total acreage of commercial forest land in the working circle, provided total volume by species for the working circle.

ACCURACY OF 1959 REINVENTORY DATA

Forest Area

Forest type maps of the county were used to obtain acreages of forest type, stand-size class, and condition class for reserved national forest areas and all areas outside the national forests. Thus, no error due to sampling was involved in these areas. Errors due to techniques or judgment in the field were possible but difficult to evaluate. Throughout all phases of the work, however, close supervision and frequent checks assured a high level of accuracy and uniformity of standards.

The chances are 19 out of 20 that the actual total area of commercial forest land in Okanogan County is within plus or minus 5.9 percent of the

estimated total of 1,685,680 acres, and that the noncommercial forest land area of the county is within plus or minus 5.5 percent of the estimated 456,080 acres.

Timber Volume

The chances are 19 out of 20 that the total board-foot volume of live sawtimber, if measured by a 100-percent cruise, would be within plus or minus 6.17 percent of the estimated total of 11,264 million board feet (Scribner rule). On the same basis, cubic-foot volume of growing stock from a 100-percent cruise would be within plus or minus 5.54 percent of the estimated 3,096 million cubic feet.

DIFFERENCES IN RESULTS OF INVENTORIES

Some of the differences between forest-type and timber-volume statistics resulting from the initial inventory and the reinventory are due to physical change--such as cutting of stands, restocking of deforested areas, and ingrowth of stands into the next larger size class. Other differences are due to variations in the procedures used to interpret and classify forest conditions, to variations in standards of utilization, and to changes in Forest Survey standards and definitions. Differences such as these preclude direct comparison of some of the statistics; comparison of other statistics is meaningful only after they have been adjusted to common standards.

Forest Area

Standards of merchantability and sampling techniques have changed too extensively in the 1937-59 period to make area comparisons meaningful. Forest growth and changes in merchantability standards have both contributed to the increase in sawtimber acreage and the corresponding decrease in poletimber area. How much of the difference shown is due to one or the other of these factors is impossible to determine.

Table 13.--Comparison of forest-area statistics for Okanogan County, initial inventory and reinventory

(Acres)

Forest area	1937	1959
Commercial:		
Sawtimber	1,151,800	1,411,300
Poletimber, seedlings and saplings	431,200	253,100
Nonstocked	22,600	21,300
Noncommercial:		
Productive-reserved	152,400	192,300
Unproductive	477,500	263,800
Total forest land	2,235,500	2,141,800

Timber Volume

Some of the differences in the volume estimates for 1937 and 1959 are due to differences in survey techniques, procedures, and methods. Changes in utilization standards and the inclusion of forest land area and timber species formerly considered noncommercial have also contributed to volume differences. The effect of these factors on the volume differences cannot be adequately measured. The 1959 volume estimate has a calculated sampling error (page 22); however, no statistical evaluation of the 1937 estimate can be made.

Table 14.--Comparison of timber volume statistics for Okanogan County, initial inventory and reinventory

(Million board feet, Scribner rule)

Species	1937	1959
Douglas-fir	2,440	4,957
Ponderosa pine	4,156	3,019
Western larch	1,127	1,279
Engelmann spruce	373	1,159
Other softwoods	140	796
Hardwoods	8	54
Total	8,244	11,264

DEFINITION OF TERMS

Land Area

Total Land Area

Includes dry land and unmeandered water surfaces.

Forest Land Area

Includes (a) land that is at least 10 percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting an influence on the climate or on the water regime; and (b) land from which the trees described in "(a)" have been removed to less than 10-percent stocking and that has not been developed for other use. Minimum area of forest land recognized in reinventory of the counties is 10 acres.

Nonforest Land Area

Land that does not qualify as forest land. Minimum area recognized in the reinventory of the counties is 10 acres.

Forest Land Classes

Commercial Forest Land Area

Forest land which is producing or capable of producing industrial wood and not withdrawn from timber utilization.

Noncommercial Forest Land Area

Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions, and productive public forest land withdrawn from commercial timber use through statute or administrative regulation.

Types

Forest Land Types

Forest land is typed on the basis of the predominant species, as indicated by cubic volume for sawtimber and poletimber stands and number of trees for seedling and sapling stands, or on the basis of forest condition, such as nonstocked cutover or burned-over land. Where none of the indicated species comprise 50 percent or more of a given stand, the stand is classified on the basis of plurality of cubic volume or number of trees. In classifying forest land by type, the minimum area recognized is 10 acres.

Commercial Forest Land

Major forest types. Local forest types are grouped into generalized types. The major forest types in Okanogan County are as follows:

Ponderosa pine. Forests in which 50 percent or more of the stand is ponderosa pine.

Lodgepole pine. Forests in which 50 percent or more of the stand is lodgepole pine.

Western white pine. Forests in which 50 percent or more of the stand is western white pine.

Douglas-fir. Forests in which 50 percent or more of the stand is Douglas-fir.

Western larch. Forests in which 50 percent or more of the stand is western larch.

Fir—spruce. Forests in which 50 percent or more of the stand is true fir, Engelmann spruce, or both.

Hardwoods. Forests in which 50 percent or more of the stand is black cottonwood or other hardwoods, singly or in combination.

Nonstocked. Areas less than 10 percent stocked with present or potential growing-stock trees.

Noncommercial Forest Land

Productive-reserved. Public forest land withdrawn from timber utilization through statute, ordinance, or administrative order, but which otherwise qualifies as commercial forest land. Types designated the same as for commercial forest land.

Unproductive. Forest land incapable of yielding usable wood products (usually sawtimber) because of adverse site conditions.

Nonforest Land Types

Vegetative. Cultivated land, stump pasture, grass, or brush on nonforest land.

Nonvegetative. Includes barrens and towns.

Unmeandered water. Includes unmeandered streams and lakes, and tideflats.

Tree Classes

Sawtimber Tree

Tree of commercial species, 11.0 inches d.b.h. and larger, that contains at least one 16-foot coniferous saw log or one 8-foot hardwood saw log to a variable top diameter never less than 8 inches inside the bark. Also, 25 percent or more of the gross board-foot volume must be free from rot or defect.

Poletimber Tree

Tree of commercial species, 5.0 to 10.9 inches d.b.h., in which 25 percent or more of the gross cubic-foot volume is free from rot and defect.

Seedling and Sapling Trees

Live trees of commercial species, less than 5.0 inches d.b.h., and of good form and vigor.

Cull Tree

Live tree of sawtimber or poletimber size that is unmerchantable for saw logs, now or prospectively, because of defect, rot, or species.

Sound cull tree. Live tree of sawtimber or poletimber size that contains 25 percent or more of sound volume but will not make at least one merchantable saw log, now or prospectively, because of roughness, poor form, or species.

Rotten cull tree. Live tree of sawtimber or poletimber size in which less than 25 percent of the total volume is sound.

Salvable Dead Tree

Standing or down dead tree that contains 25 percent or more of sound volume and at least one merchantable 16-foot coniferous or 8-foot hardwood saw log.

Stand-Size Classes

Sawtimber Stand

Stand of sawtimber trees having a minimum per-acre net volume of 1,500 board feet (International 1/4-inch rule).

Large sawtimber stand. Stand in which the majority of the volume is in trees 21.0 inches d.b.h. and larger.

Small sawtimber stand. Stand in which the majority of the volume is in trees from 11.0 to 20.9 inches d.b.h.

Uncut sawtimber stand. Sawtimber stand in which less than 10 percent of its volume has been removed by cutting.

Residual sawtimber stand. Sawtimber stand in which 10 percent or more of the volume has been removed by cutting, and in which the residual per-acre volume amounts to at least 1,500 board feet (International 1/4-inch rule).

Poletimber Stand

Stand failing to meet sawtimber stand specifications but at least 10 percent stocked with poletimber and larger (5.0 inches d.b.h. and larger) trees and with at least half the minimum stocking in poletimber trees.

Seedling and Sapling Stand

Stand not qualifying as either a sawtimber or poletimber stand but at least 10 percent stocked with trees of commercial species and with at least half the minimum stocking in seedling and sapling trees.

Nonstocked Area

An area less than 10 percent stocked with present or potential growing-stock trees.

Stocking

Stocking is the extent to which growing space is effectively utilized by present or potential growing-stock trees of commercial species. "Degree of stocking" is synonymous with "percentage of growing space occupied" and means the ratio of actual stocking to full stocking for comparable sites and stands. Stocking may be measured in terms of number of trees, volume, basal area, cover canopy, or other criterion or combination of criteria.

Well-Stocked Stand

A stand that is 70 percent or more stocked with present or potential growing-stock trees.

Medium-Stocked Stand

A stand that is 40 to 69 percent stocked with present or potential growing-stock trees.

Poorly Stocked Stand

A stand that is 10 to 39 percent stocked with present or potential growing-stock trees.

Nonstocked Area

An area less than 10 percent stocked with present or potential growing-stock trees.

Timber Volume

Live Sawtimber Volume

Net volume in board feet of live sawtimber trees of commercial species:

Scribner rule. The common board-foot log rule used in determining volume of sawtimber in the Pacific Northwest.

International 1/4-inch rule. The standard board-foot log rule adopted nationally by the Forest Service in the presentation of Forest Survey volume statistics.

Growing Stock

Net volume in cubic feet of live sawtimber trees and live poletimber trees from stump to a minimum 4.0-inch top (of central stem) outside bark.

All-Timber Volume

Net volume in cubic feet of live and salvable dead sawtimber trees and poletimber trees of commercial species, and cull trees of all species from stump to a minimum 4.0-inch top outside bark.

Timber Cut

Annual Cut of Live Sawtimber

The net board-foot volume of live sawtimber trees cut or killed by logging on commercial forest land during a specified year.

Timber products from live sawtimber. The volume of timber products cut from live sawtimber.

Logging residues from live sawtimber. The volume of sound wood in live sawtimber trees cut or killed by logging on commercial forest land and not converted to timber products.

Annual Cut of Growing Stock

The net cubic-foot volume of live sawtimber and poletimber trees cut or killed by logging on commercial forest land during a specified year.

Timber products from growing stock. The volume of timber products cut from growing stock.

Logging residues from growing stock. The volume of sound wood in growing stock cut or killed by logging on commercial forest land and not converted to timber products.

TREE SPECIES

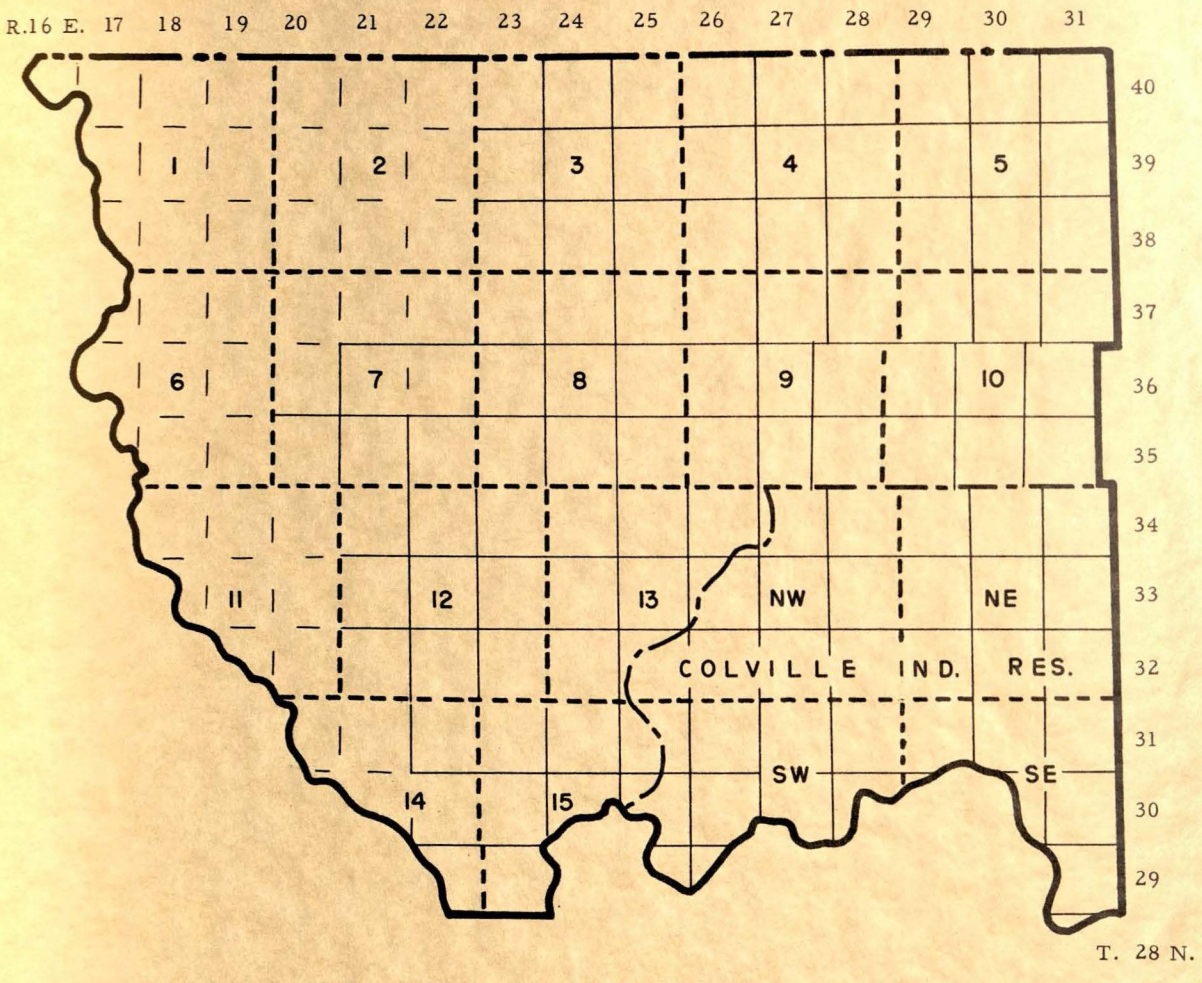
Tree species commonly found in Okanogan County include:

Softwoods:

- Douglas-fir (*Pseudotsuga menziesii*)
- Engelmann spruce (*Picea engelmannii*)
- Grand fir (*Abies grandis*)
- Lodgepole pine (*Pinus contorta*)
- Mountain hemlock (*Tsuga mertensiana*)
- Pacific silver fir (*Abies amabilis*)
- Ponderosa pine (*Pinus ponderosa*)
- Subalpine fir (*Abies lasiocarpa*)
- Subalpine larch (*Larix lyallii*)
- Western hemlock (*Tsuga heterophylla*)
- Western larch (*Larix occidentalis*)
- Western redcedar (*Thuja plicata*)
- Western white pine (*Pinus monticola*)
- Whitebark pine (*Pinus albicaulis*)

Hardwoods:

- Black cottonwood (*Populus trichocarpa*)
- Quaking aspen (*Populus tremuloides*)
- Red alder (*Alnus rubra*)
- Western paper birch (*Betula papyrifera* var. *commutata*)



I N D E X M A P of

OKANOGAN COUNTY,

STATE of WASHINGTON

showing divisions of 2" = 1 mile maps

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